

### THE COLD WEATHER OF LAST WINTER AND SPRING

THE winter and spring just past will be historically memorable for the unprecedentedly cold weather which has been the outstanding characteristic. More intense cold has no doubt been experienced in former years for single nights, or for brief intervals of a few days, than has been recorded anywhere in these islands during the past six months; but for upwards of a century since thermometric observations of the temperature of the air began to be made in Great Britain there has not occurred, so far as these observations show, a tract of weather so cold, as respects duration and intensity combined, as has prevailed during the half year ending with May.

From January, 1764, we have a consecutive series of monthly mean temperatures before us from observations made on the south shores of the Moray Firth and of the Firth of Forth. From this unique and valuable record we give the following periods of protracted low temperatures extending over intervals of from five to ten months, which have occurred in North Britain during the past 115 years, the amount of the depression below the means of the months being at least three degrees:—

Date of Cold.	Duration in months.	Under mean temperature of the months.
February–November, 1782 ...	10 ...	–5°1
January–August, 1799 ...	7 ...	–3°8
October–March, 1799–1800 ...	6 ...	–3°3
November–April, 1807–8 ...	6 ...	–3°5
March–August, 1812 ...	6 ...	–3°4
October–March, 1813–14 ...	6 ...	–3°6
November–August, 1815–16 ...	10 ...	–3°5
January–May, 1838 ...	5 ...	–4°2
January–May, 1855 ...	5 ...	–3°5
December–April, 1859–60 ...	5 ...	–3°0

Of these periods the most intense and, excepting that of 1815–16, the most protracted cold was that of 1782, when, during the ten months beginning with February, the temperature was 5°·1 under the mean of these months, the deficiency being 5°·4 for the five months from February to June, and 4°·8 from July to November. It may be noted that of these ten periods of protracted cold weather none occurred from 1764 to 1781; there were no fewer than seven during the next thirty-four years, and during the sixty-three years which have elapsed since 1816, only three such cold periods have been recorded.

Happily the extraordinary development and extension of meteorological observation which has taken place in late years enables us to define with some precision the distribution of the great cold of 1878–79 over the British Isles. For this purpose we have selected ninety-two places well distributed over the United Kingdom, and calculated their mean temperatures for the six months from December to May, and compared them with Buchan's mean temperatures and isothermals of the British Isles.

From the results thus obtained, it appears that this cold weather was felt in its greatest intensity in Central England, where, within a circuit roughly defined by a line passing near Stonyhurst, Shrewsbury, Cirencester, Oxford, Audley End, Yarmouth, Kelstern in Lincolnshire, and Durham, the depression of the temperature below the means of the six months exceeded 6°·0, falling to 6°·7 below the average at Cirencester and 7°·4 at Shrewsbury. Large portions of the south of Scotland between the Solway and the Firth of Forth and in Perthshire had also a mean temperature for the period fully 6°·0 under the average. Northwards through Central Scotland as far as Lairg in Sutherland, the depression of temperature was only about 5°·0 below the average; and this appears to have been about the deficiency experienced over central Ireland, falling, however, to 5°·7 at Armagh, and 5°·3 at

Lissan, on the west of Loch Neagh. Everywhere round the coast the cold was less intense than in the interior. Temperatures were from a degree to a degree and a half relatively milder along the east coast, and still milder on the west coast; indeed, Shetland, Orkney, the Hebrides, the south of Ireland, Scilly, and the Channel Isles had a mean temperature only from 2°·0 to 3°·0 below the average temperature of the period, so greatly was the conserving influence of the ocean felt on the temperature of places in the west and south during this memorable cold weather.

During these six months, the greatest depression of temperature, absolutely as well as relatively to the monthly means, took place in December and January. If the monthly means be only looked at, the absolutely greatest temperature depression during the period was in December, in the counties of Cumberland and Dumfries, and along the upper reaches of the Tweed and Clyde, with their affluents. Within this region the mean temperature of December, reduced to sea-level, did not rise above 29°·0, falling at some places as low even as 27°·5. The week of intensest cold was the second week of December, when the mean temperature fell at many places in England, Scotland, and Ireland, to from 15°·0 to 18°·0 below the average of the season.

If we look at the monthly mean temperatures of the past 115 years as compared with their averages, with the view of ascertaining the duration of the most protracted periods of cold weather which have occurred during this long interval of years, defining as a period of cold weather an interval of time during which the mean temperatures of the months were continuously under their averages, we find that there have occurred four such noteworthy periods of protracted cold weather, during which the mean temperature of no month included in it rose above its average. These, arranged in the order of their duration, are (1) A period of 19 months, extending from September, 1798, to March, 1800, the mean temperature of this long period being 2°·8 below the average; (2) A period of 17 months from September, 1859, to January, 1861, which was 2°·2 below the average; (3) A period of 15 months, from October, 1815, to December, 1816, which was 3°·0 below the average; and (4) A period of 14 months, from February, 1782, to March, 1783, the mean temperature of which fell 4°·4 below the average of the months. It is thus only too evident that while the cold weather most of us have been suffering from these six months exceeds in intensity any other past period of cold weather in these islands of like duration of which we have an exact and authentic record, the temperature observations of the past 115 years disclose to us tracts of unseasonably cold weather, two or even three times more protracted than the interval which has yet elapsed since the present cold set in with such intensity and persistence in November last.

### THE ICE CAVERN OF DOBSCHAU<sup>1</sup>

WHILE on a tour in Hungary last summer I had the opportunity of visiting an ice cavern near the town of Dobschau; the discoverer of the cavern kindly conducted me through it and wished me to make it known to the English public; with this object in view I have written the following short account:—

The cavern is situated to the north-west of Dobschau, and is approached through a narrow winding limestone valley, "the Stracenaer Thal." It has a general direction from west to east in the interior of a mountain whose slope faces north; the descent into it varies from oblique to precipitous, the entrance, which is very narrow, being situated at the highest point of the cavern; the ice consists of innumerable layers frozen together one upon the

<sup>1</sup> Dobschau is situated a little to the south of the Kaschau-Oderberger-Bahn, the nearest station on that line being Iglo.



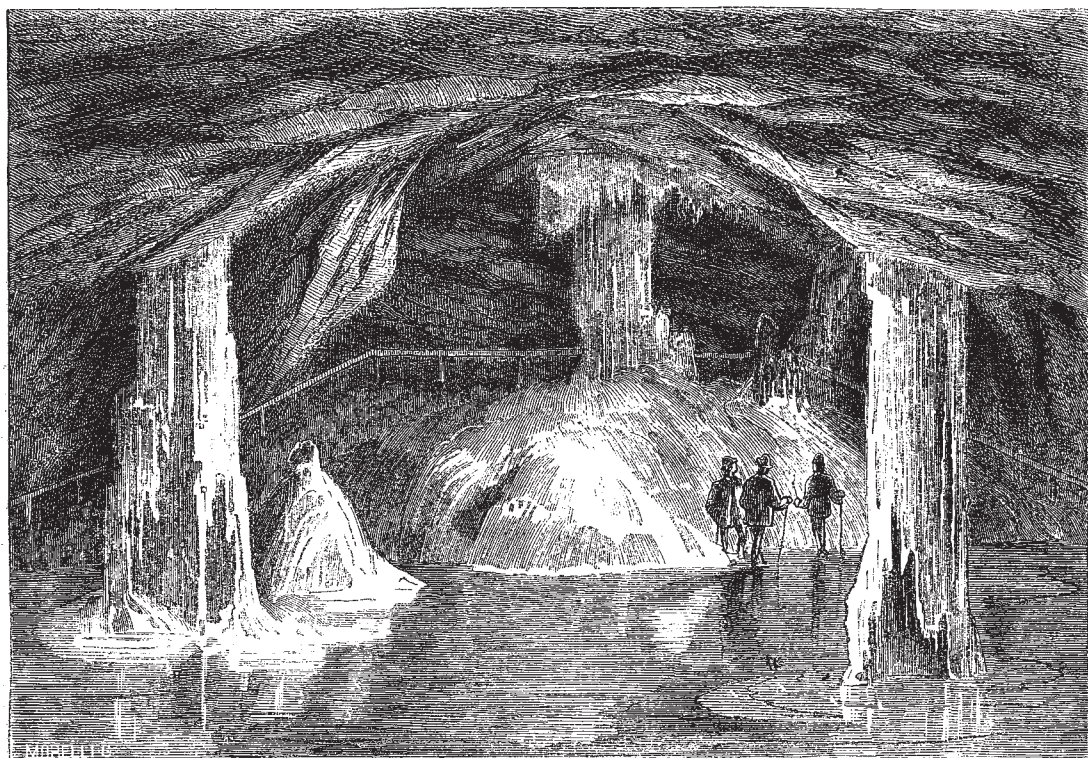


FIG. 1.—Portion of the Great Saloon.

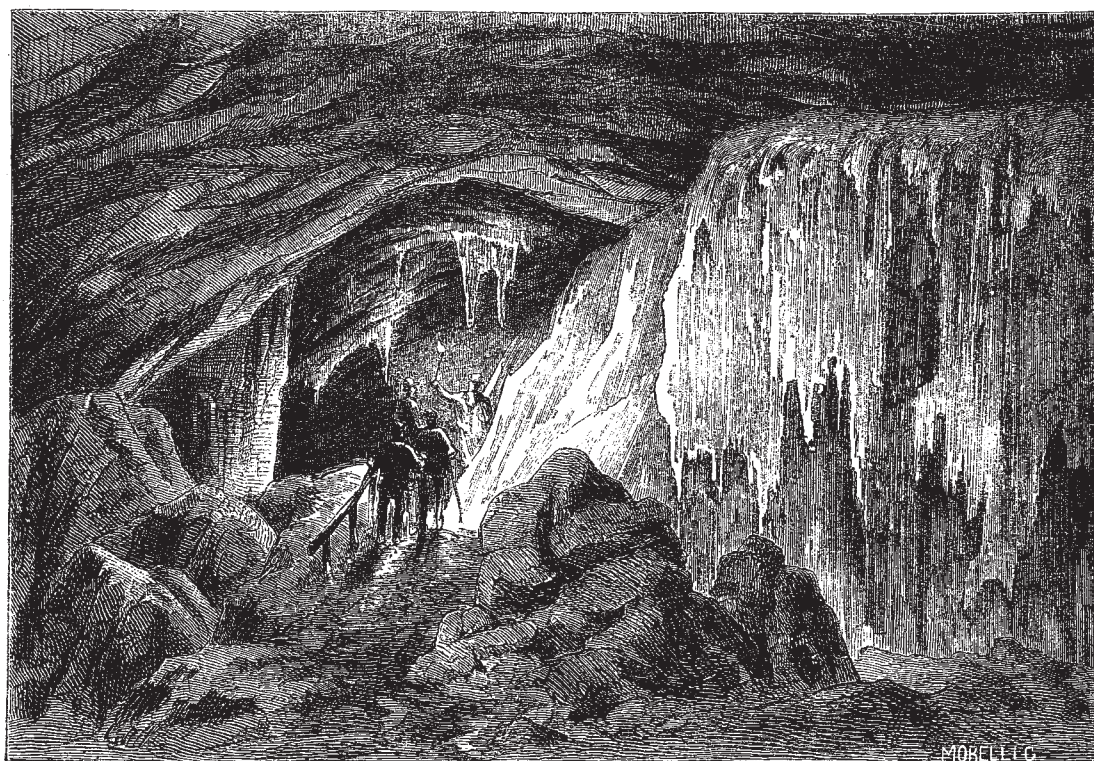


FIG. 2.—The Corridor.



other, and assuming various fantastic shapes. The total surface of ice and rock is 8,874 square metres, that of the former being 7,171 square metres, of the latter 1,703 square metres; the mass of the ice amounts to 125,000 cubic metres.

The cavern consists of two parts, an upper and lower stage; the former is reached immediately after leaving the entrance, its floor being formed of ice, its roof and walls of limestone; it is partially divided into two unequal chambers, the small and great saloons (Fig. 1), by a curtain of rock descending from the roof. The small saloon is not situated on the same level as the great saloon. In the great saloon are three ice pillars (Fig. 1); they are translucent, and down the cylindrical hollow of one pillar there is a continuous though small flow of water; in addition there are numerous other ice ornaments which have received fanciful names. The eastern end of the saloon is contracted into a very narrow corner; at this point there has been a landslide corresponding to a crater-shaped depression in the slope of the Duosa Mountain, in which the cavern is situated. In the small saloon to the right of the entrance is a waterfall composed entirely of ice.

The lower stage consists of a corridor (Fig. 2) following the south side wall of the saloon; the downward prolongation of the dome-shaped rock wall of the saloon forms the south corridor wall, while the naturally formed cross-section of the ice constitutes the northern. The corridor originally consisted of two portions, a right and left wing, separated by a mass of ice; this has now been bored through. The entire length of the corridor is 200 metres.

The right corridor-wing is reached from the small saloon by going down a steep flight of steps through a natural opening; the mass of ice whose upper surface forms the floor of the saloon after touching the roof suddenly terminates so as to make a nearly vertical wall to the corridor; the floor of the latter sinks down into the depths below, terminating in a mass of *débris*; this point probably forms a natural outlet for the water.

In the left corridor-wing is a magnificent ice structure termed the Grotto (Fig. 3).

The cooling of the air and the permanent low temperature (the mean of the year being  $-86^{\circ}$  C.) of the cavern are due to its height and northern aspect, as well as to its narrow opening and contracted exit canal, and to its floor gradually sloping inwards; as a result of this, the water is converted into ice, and the permanence of the latter thus insured.

Through the kindness of Herr Ruffny, the discoverer, and Dr. Pelech, I have been enabled to obtain the loan of the woodcuts.

W. BEZANT LOWE

### THE VISITATION OF THE ROYAL OBSERVATORY

ON Saturday last the annual visitation of the Royal Observatory was held, when the Astronomer-Royal read his annual report, which refers to a period of thirteen lunations, from the new moon of 1878, May 2, to the new moon of 1879, May 20. We notice some of the most important points in this report:—

Considerable alterations have been made in the great equatorial, so as to make the instrument easy for use with the long half-prism spectroscope. The declination axis

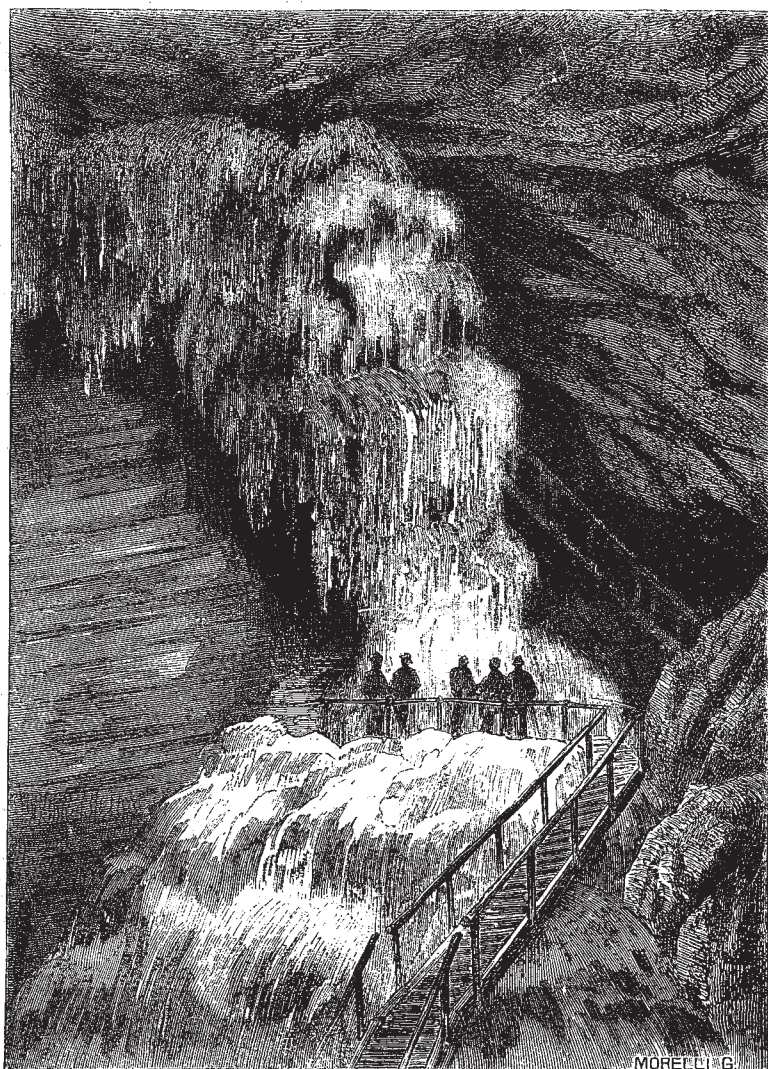


FIG. 3.—The Grotto.

being meridionally excentric by 14 inches as regards the polar axis, the observing-chair may be made available for eye-observations and for spectroscopic observations respectively, by reversing the instrument in hour-angle so as to take advantage of this excentricity.

With regard to the numerous group of minor planets, the Berlin authorities have most kindly given attention to the Astronomer-Royal's representation, and we have now a most admirable and comprehensive ephemeris.